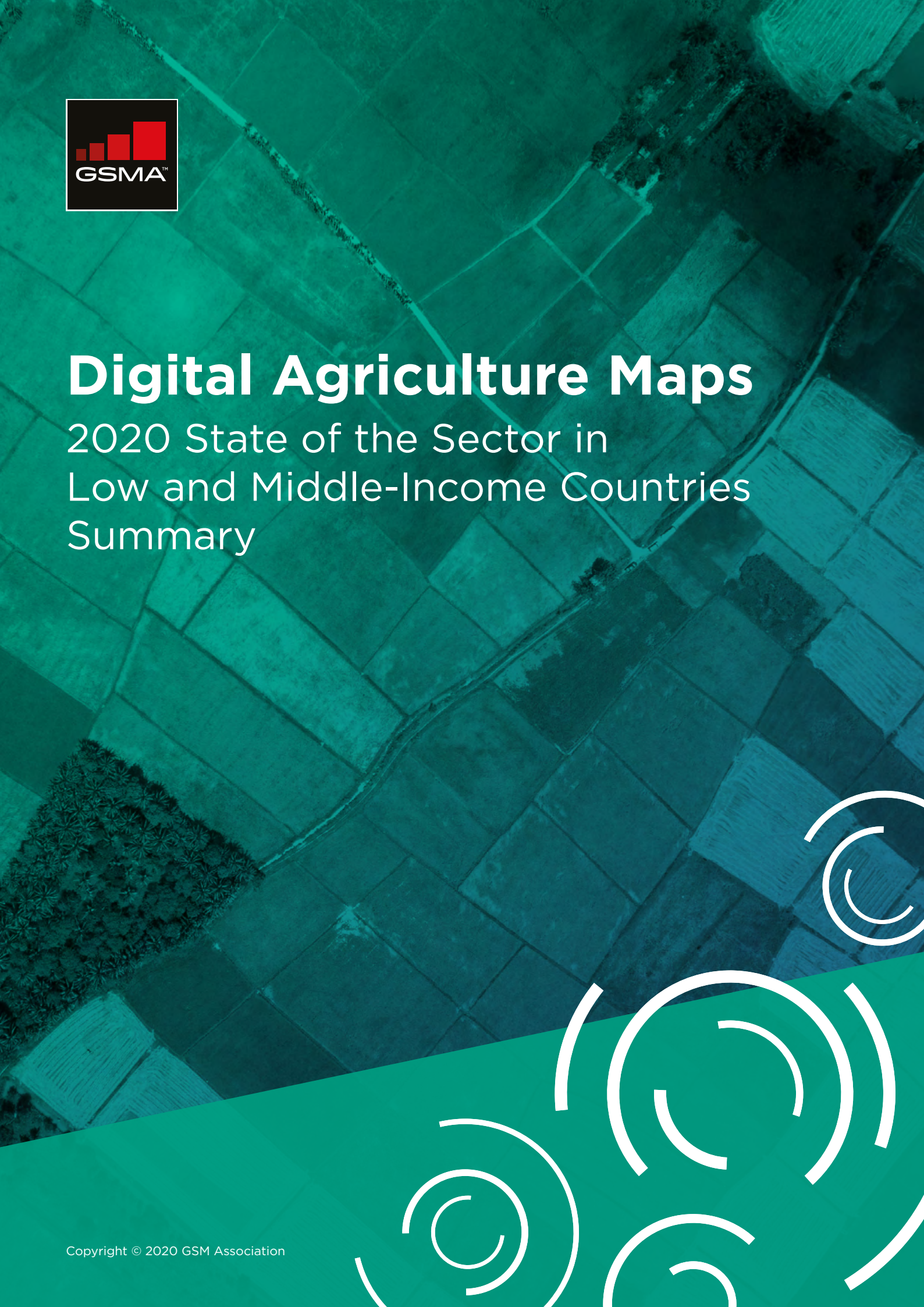

Digital Agriculture Maps

2020 State of the Sector in Low and Middle-Income Countries Summary

GSMA AgriTech Programme

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with nearly 400 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at www.gsma.com

Follow the GSMA on Twitter: @GSMA

We bring together and support the mobile industry, agricultural sector stakeholders, innovators and investors in the agritech space to launch, improve and scale impactful and commercially viable digital solutions for smallholder farmers in the developing world.

Follow us on Twitter: @GSMAm4d

IDH Farmfit supports companies in making service delivery to smallholder farmers profitable – for farmers and companies alike. Based on the experience of supporting and systematically analysing 70+ companies across sectors and geographies, IDH Farmfit provides strategic advice, technical assistance and de-risking finance to companies to improve and scale their service delivery to smallholders. Digitisation of value chains represents a key opportunity to reduce costs and increase the scale of service delivery. IDH Farmfit's digital transformation advisory is providing tailored recommendations on how digital technology can add value to businesses and the farmers they serve.

For more information, please visit us at www.idhtrade.org/farmfit

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Executive summary

Agriculture is the backbone of most developing economies and a major source of food, income and employment for 500 million smallholder households globally. However, smallholder farmers face significant challenges that limit their agricultural productivity and earning potential.

These challenges include poor access to agronomic, market and weather information; lack of access to finance for agricultural inputs and capital investments; poor access to infrastructure and modern equipment; fragmented or inadequate access to markets; and more frequent and extreme weather events resulting from climate change.

Over the last decade, a number of digital agriculture solutions have reached sufficient scale to become commercially attractive to investors and have a positive socio-economic impact on smallholder farmers. From agronomic advisory to e-commerce platforms, these solutions are improving agricultural knowledge, enhancing productivity and boosting incomes. However, the digital agriculture sector is still young and evolving — donor financing remains critical to the development of the sector, and agritech investors will need both commercial patience and a long-term vision for growth and expansion. There is a broad range of digital tools in agriculture, from low-tech solutions disseminating agronomic advisory to high-tech holistic tools involving satellites, sensors and big data analytics. Together, they deliver an array of benefits to smallholder farmers, providing a pathway to the formal economy and helping them become more resilient to the effects of climate change and other challenges, like the COVID-19 pandemic.

Despite the adoption of digital agriculture tools to address the challenges facing the sector, smallholder farmers have yet to experience the widespread benefits of this digital transformation. Realising the full potential of digital agriculture solutions will require sharing and implementing best practices. Several attempts have been made to provide a complete picture of the digital agriculture services available to smallholder farmers in LMICs (low and middle-income countries), but building and maintaining a live inventory of solutions in this constantly evolving space has been a challenge for the industry.[1] **The GSMA AgriTech's Digital Agriculture Maps (DAMs), produced in collaboration with IDH Farmfit provides a window into the digital agriculture landscape to help industry practitioners and potential investors understand key trends and emerging opportunities.**

At the core of DAMs is the AgriTech programme's dataset of over **700 active digital agriculture services tracked as of January 2020, which has grown rapidly from 53 services in 2009. The services are divided into five use cases: digital advisory and agri digital financial services (access to services), agri e-commerce and digital procurement (access to markets) and smart farming (access to assets).** These are further divided into **24 sub-use cases that address five key challenges: the agricultural knowledge**

1 Examples of online platforms tracking digital agriculture innovations in LMICs are the Global Innovation Exchange (GIE, 2020) and the CGIAR Evidence Clearinghouse (CGIAR, 2020). In high-income countries, organisations such as AgFunder, Traxcn and Crunchbase track technology products and start-ups, including those with some presence in LMICs, for investors and industry partners.

gap, network and internet connectivity, financial exclusion, poor access to markets and climate change. The digital agriculture services included in this report are offered both directly to smallholder farmers through a business-to-consumer (B2C) model, and indirectly as enterprise solutions targeting agricultural value chain actors such as agribusinesses and cooperatives under a business-to-business-to-consumer (B2B2C) model.

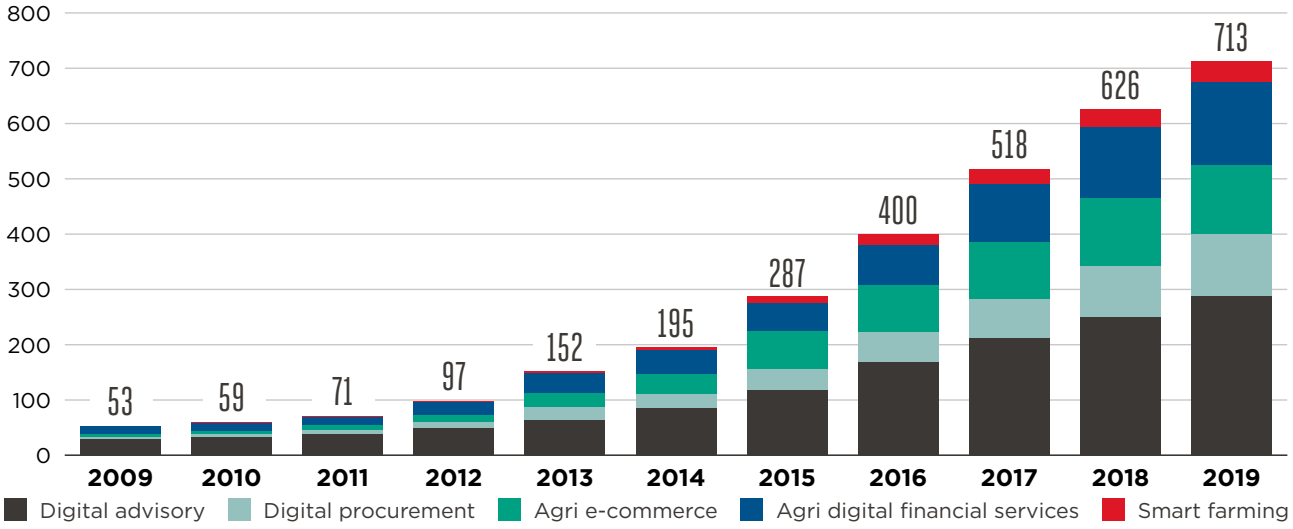
The imperative of this work is increased by the ongoing **COVID-19 pandemic, which has magnified systemic challenges in the agriculture sector** faced by smallholder farmers and value chain actors. Major disruptions to food and input supply chains have put the finances and food security of smallholder farmers at risk, and limited their ability to plan and invest in the next growing season. **Digital agriculture tools offer ways for both commercial and subsistence farmers to become more agile and efficient in adapting to the pandemic.** There is growing evidence that value chain actors that already use digital solutions in their operations are finding ways to repurpose them to address the new challenges of COVID-19.

Throughout this report, we highlight specific use cases to encourage innovation and adoption of best practices. Global trends are broken down by region and use case to help practitioners understand the specific conditions needed for digital agriculture solutions to scale. The report concludes with an outlook section that looks at the current trajectories of digital agriculture in different business models, user needs, the uptake of new technologies, and opportunities for donors, commercial and impact investors to help shape the agritech sector.

Digital agriculture: Global and regional trends

Figure 1

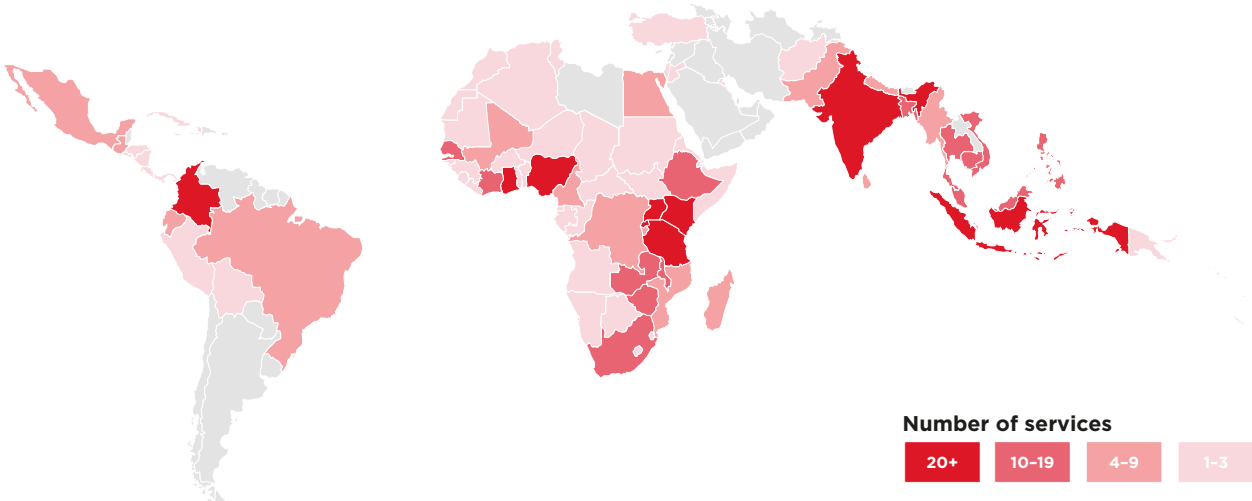
Number of active digital agriculture services by use case, 2009–2019



The map in Figure 2 uses GSMA AgriTech data to show the global prevalence of active digital agriculture services in LMICs across all use cases in January 2020. There is significant variation in the number of active services in countries with 20+ services. Kenya has 95 active services, India – 68, Nigeria – 47 and Ghana – 45. The lowest is Colombia, with 21 services.

Figure 2

Global map of active digital agriculture services, January 2020*



* Grey indicates either no data is available for the country or the country is not a LMIC

Global trends in key use cases

- Digital advisory services first emerged in LMICs in the late 1990s to address the knowledge gaps among smallholder farmers, and they remain **the most prevalent use case, providing agricultural knowledge, weather predictions and information on market prices.** While rich media services delivered via apps are expanding, basic 2G channels (text and voice) remain vital to delivering advisory to smallholder farmers. Digital advisory services are becoming more intelligent, providing highly localised, granular information to support farmers in decision making. They are also becoming more complex, with new services providing specialised services on demand.
- New sources of data, technology and relationships with farmers are being leveraged to increase financial inclusion among smallholder farmers. **Although digital credit products are becoming widely available, very few address the long-term financing needs of smallholder farmers**, for example, investments in machinery, farming tools and irrigation systems. Meanwhile, digital credit scoring and crowdfunding tools have grown significantly in the last five years, opening access to digital financial services for farmers by providing alternative ways to aggregate and analyse financial data.
- The shift from indemnity-based to index-based insurance, combined with the **growing use of mobile phones as a low-cost way to scale traditional insurance, is unlocking new opportunities for insurance providers to serve smallholder farmers.** Digitally-enabled agricultural insurance is gaining traction, but lack of awareness among smallholder farmers and challenging business models are limiting its reach.
- Digital procurement tools are bringing visibility and efficiencies to agribusinesses, cooperatives and smallholder farmers in the last mile of agricultural value chains. **The digitisation of paper records is the foundation of all procurement tools, but holistic solutions that integrate both payments and product tracing are emerging to support more sustainable farming**, from the ability to secure long-term supply to smallholder farmers earning a living income.
- **Agricultural produce is growing in popularity on e-commerce platforms in LMICs, presenting an opportunity for consumers and smallholder farmers to forge closer connections.** The proliferation of agri e-commerce in any market depends on several enabling factors, including important infrastructure like telecommunications, logistics networks and financial services. Mobile money providers, including mobile network operators (MNOs), have valuable assets that can remove some of the barriers to e-commerce and address the pain points of buyers and sellers.
- **Smart farming is the latest use case to take hold in LMICs. While the mobile Internet of Things (IoT) is a key enabler for smart farming solutions, IoT deployments in the agriculture sector in LMICs can still be expensive and difficult to roll out.** Equipment monitoring was the first use case to emerge, but smart shared assets now account for over 60 per cent of the smart farming tools we are tracking globally. While smart shared asset solutions facilitate access to capital-intensive agricultural assets, most are not economically viable for farmers due to the small size of their farms and low incomes.

Regional trends

- **As of January 2020, the GSMA AgriTech programme has tracked 437 services in Sub-Saharan Africa, 105 in South Asia, 99 in Southeast Asia and 59 in Latin America and the Caribbean. Sub-Saharan Africa has seen the most growth in the uptake of digital agriculture tools.** Digital advisory is the most established use case in all regions, except in Latin America and the Caribbean where agri e-commerce has seen the most significant growth.
- **In Sub-Saharan Africa, digital financial services have experienced considerable growth, driven by the prevalence of mobile money across many markets.** Mobile money has made it viable to provide financial services via mobile phones and extend the reach of services to segments of the population like farmers, which financial service providers have traditionally considered too difficult and expensive to serve. However, this growth has been concentrated largely in East Africa, where mobile money adoption is more widespread.

Nearly half of all digital financial services tracked in Sub-Saharan Africa are available in five countries: Kenya, Uganda, Tanzania, Burundi and Rwanda.

- **In South Asia, some of the most well-established digital advisory services are in operation, with regional providers among the first to launch and scale these solutions.** South Asian MNOs played a leading role in the development of the agricultural value-added services (Agri VAS) model, delivering information services to farmers through large-scale digital agricultural advisories in India, Pakistan, Sri Lanka and Bangladesh. South Asia also has some of the most successful agri e-commerce services in LMICs, especially in India. Agri e-commerce in the region has also benefited from the presence of a few well-established companies and a larger banked population, which is boosting demand for agricultural produce in urban areas via digital platforms.
- **In Southeast Asia, digital agriculture has benefited from the relative prevalence of structured commercial value chains and dynamic technology hubs in countries such as Indonesia, Vietnam and the Philippines.** Digital procurement is now as established as digital advisory despite appearing much later, and similar but slower trends are emerging in other regions. Smart farming is also growing significantly due to wider adoption of IoT. After a slow start, digital financial services are growing rapidly, particularly in the last four years. Mobile money solutions are not widespread in the region, but innovations in using digital agriculture data to enable financial services are emerging.
- **In Latin American and Caribbean countries, agri e-commerce is the most established use case, driven by demand from urban centres, comparatively better logistics networks and a few well-established companies operating in multiple countries in the region.** Considering the potential to scale digital procurement solutions due to the presence of many cash crop value chains, the region lags behind in this area, presenting an opportunity for local agritech start-ups and international companies to enter this space. Digital financial services have also experienced staggered growth, but recent growth in credit scoring and crowdfunding solutions indicates some progress is being made.

Target audience

This report is aimed primarily at **investors** and **donors** to support their global and regional strategies and investments for social and commercial impact.

Agritech companies and **MNOs** actively serving the rural sector will also find valuable information to position themselves more competitively in their markets.

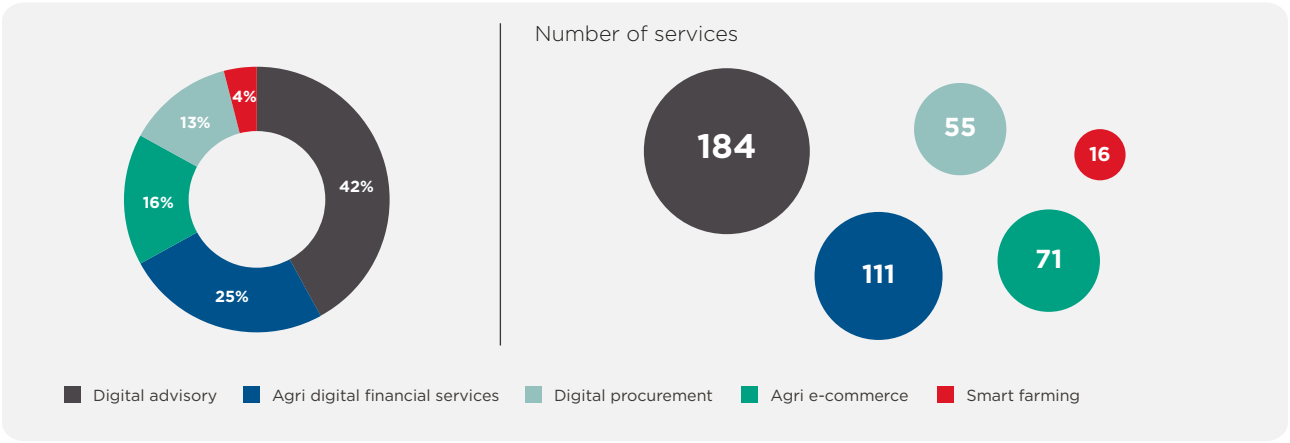
Value chain actors, such as **agribusinesses** and **cooperatives**, will gain insights into opportunities to launch digitisation initiatives in their operations and the solutions available in their markets.

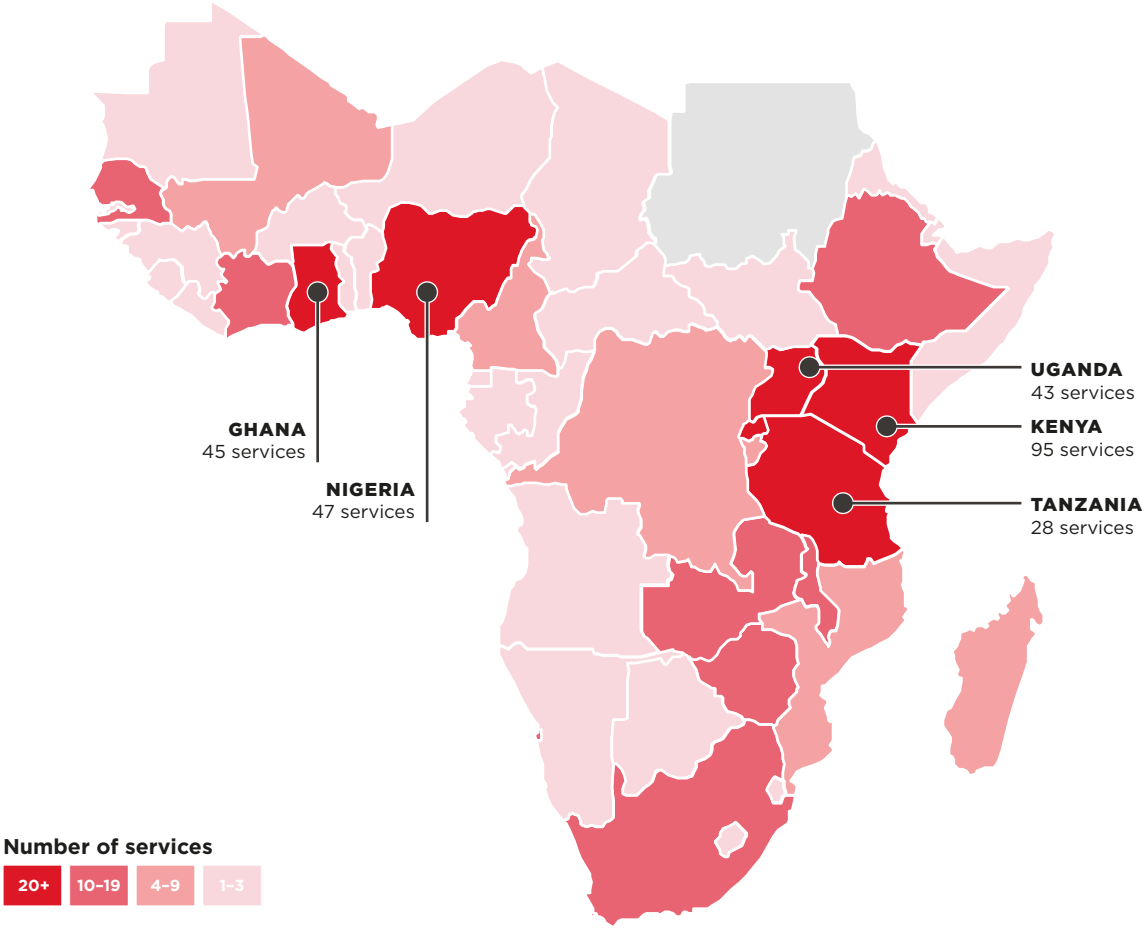
The report is also a tool for **mobile money providers (MMPs)** and **financial service providers (FSPs)** seeking partnerships to provide financial services to the rural sector.

Finally, **institutional actors,** such as government, multilateral agencies and NGOs, will find useful information on using digital solutions to improve their agriculture sector programmes.

Figure 3

Regional map of active digital agriculture services by use case, Sub-Saharan Africa, January 2020

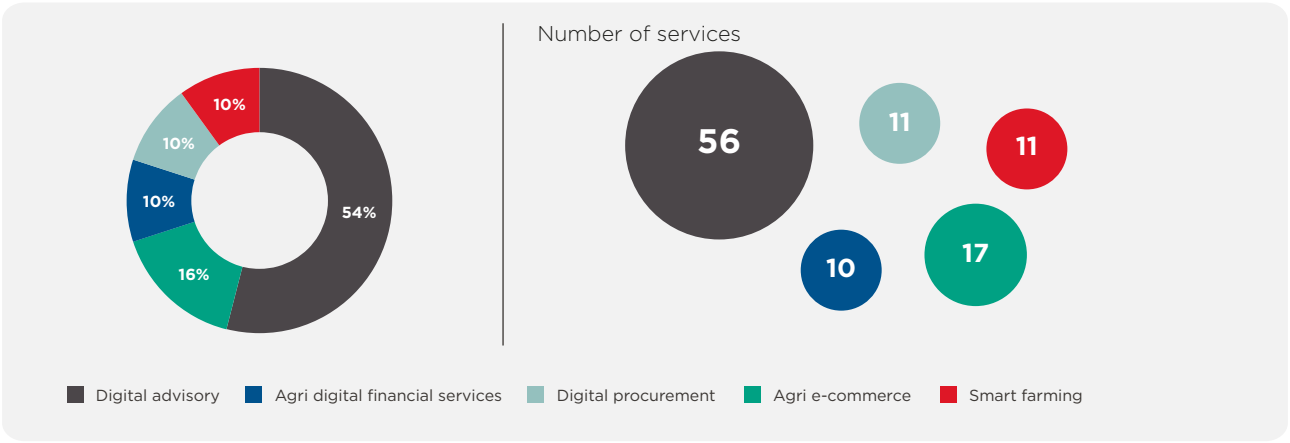


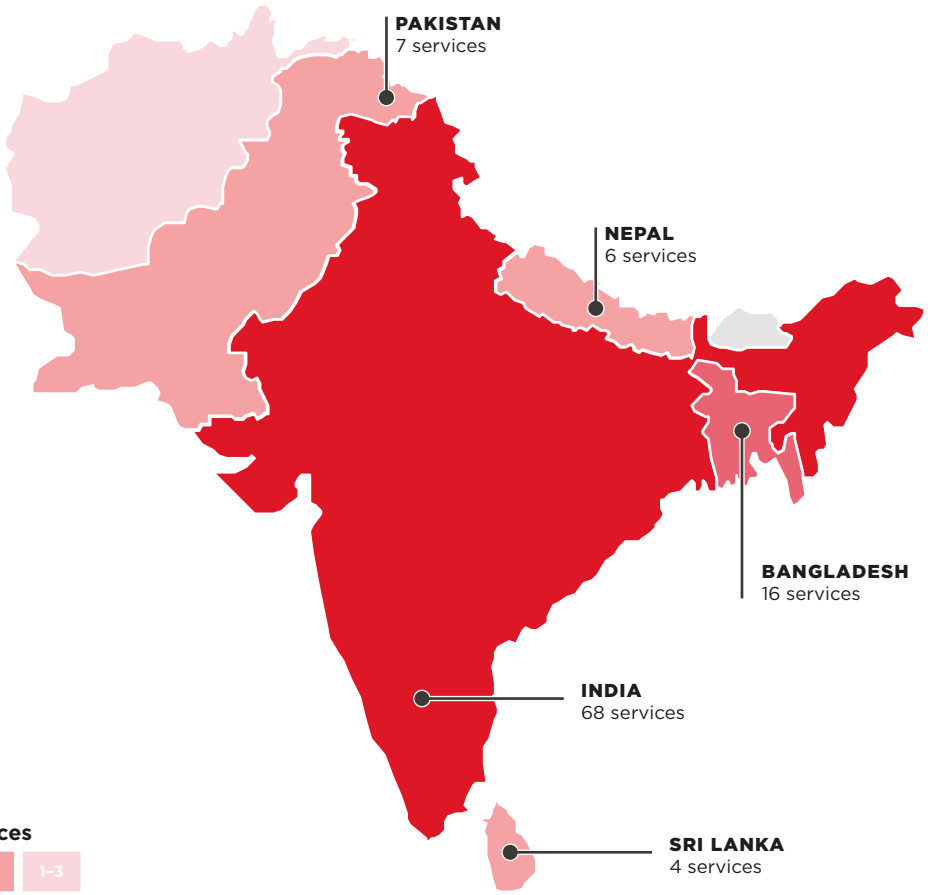


Digital advisory	Agri digital financial services	Digital procurement	Agri e-commerce	Smart farming
ThirdEye – Mozambique, Kenya	**Agri360** – Zambia	**TaroWorks** – Kenya, Nigeria	**eMiska** – Zambia	**AcquahMeyer Agricultural Drone Services** – Ghana
Vodacom 4502 (3-2-1) – Democratic of Congo	**Agri PME** – Togo	**mFarmer** – Uganda, Rwanda	**FarmFresh** – The Gambia	**Kóbiri** – Guinea Conakary
CowTribe – Ghana	**CashCard** – Nigeria	**WeightCapture** – Côte D'Ivoire, Kenya, Nigeria, Tanzania	**IzyShop** – Mozambique	**HelloTractor** – Nigeria
EzyAgric – Uganda	**FarmDrive** – Kenya	**AgroMall** – Nigeria	**Jinukun** – Benin	**WeFlyAgri** – Côte D'Ivoire
mAgri – Botswana	**Bayseddo** – Senegal	**Metajua** – Uganda, Tanzania, Rwanda, Burundi, DRC, Madagascar	**HeheMart** – Rwanda	**EcoFarmer Vaya Tractor** – Zimbabwe

Figure 4

Regional map of active digital agriculture services by use case, South Asia, January 2020

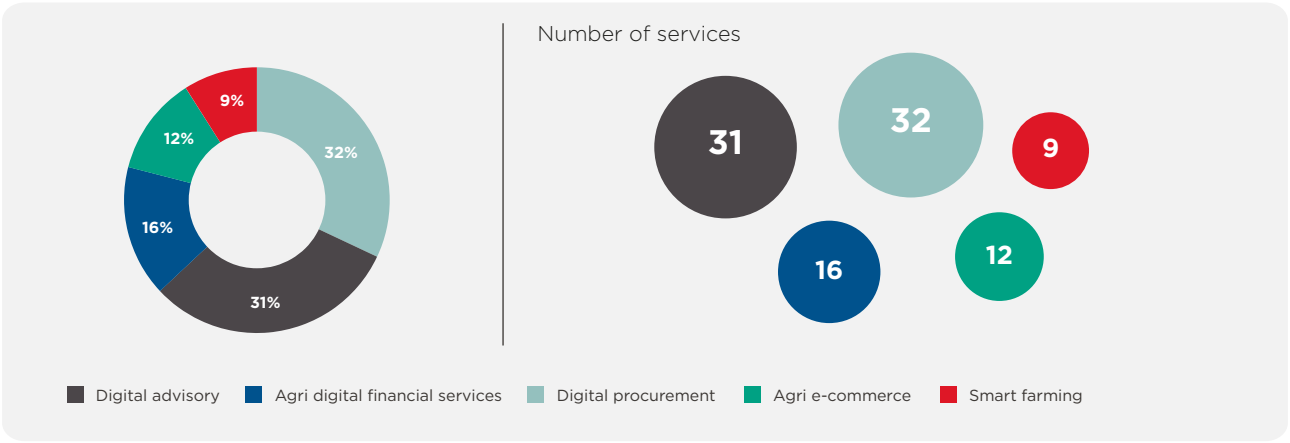


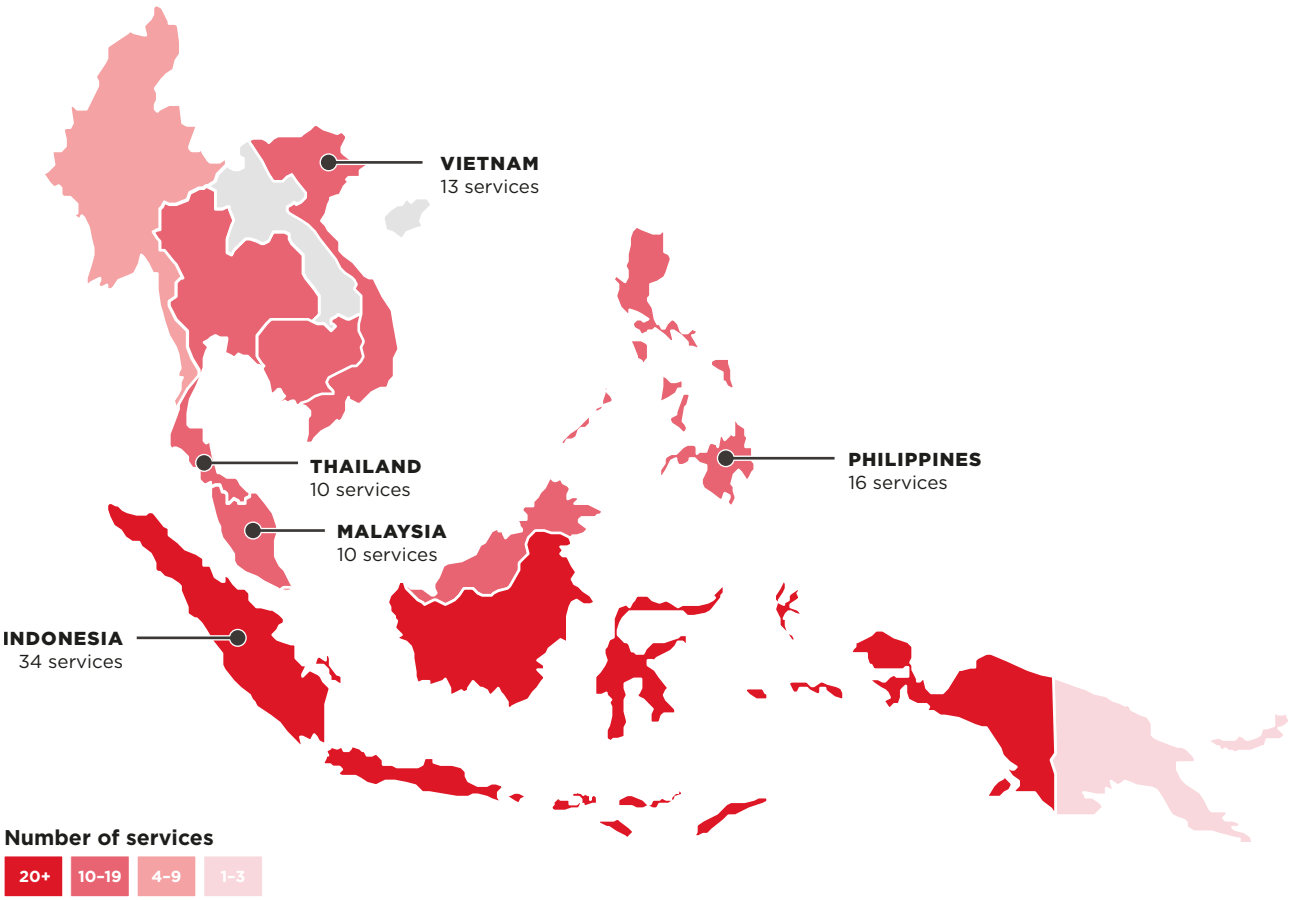


Digital advisory	Agri digital financial services	Digital procurement	Agri e-commerce	Smart farming
Khushaal Zamindar – Pakistan	**The LenddoScore** – India	**Agri-Gate** – Sri Lanka	**Ricult** – Pakistan	**Cowlar** – Pakistan
GeoKrishi – Nepal	**Green Delta's Weather Index Based Agriculture Insurance** – Bangladesh	**NeoInt** – India	**Chadal** – Bangladesh	**Nano Ganesh** – India
Krishi Sheba – Bangladesh	**iFarm app** – Sri Lanka	**SmartMoo** – India	**Ninjacart** – India	**SmartFarm** – Bangladesh
Govi Mithuru – Sri Lanka	**iFarmer** – Bangladesh	**Datagreen solutions** – India, Bangladesh	**Go4Fresh** – India	**Cowdy** – Bangladesh
Malomat m-agriculture service – Afghanistan	**farMart's agricultural loans** – India	**AgriBuddy** – India	**Farm to Home** – Pakistan	**Hello Tractor** – Pakistan

Figure 5

Regional map of active digital agriculture services by use case, Southeast Asia, January 2020

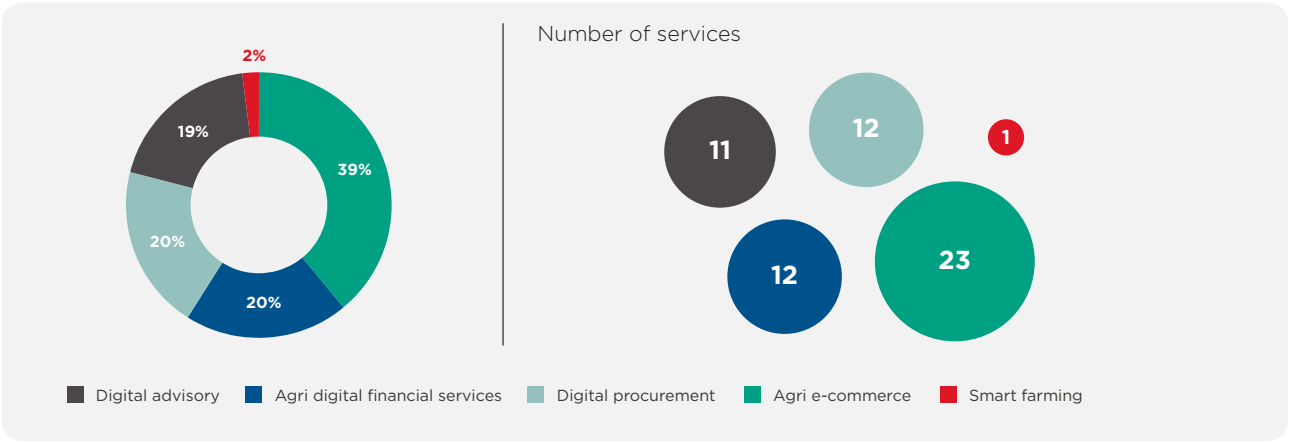




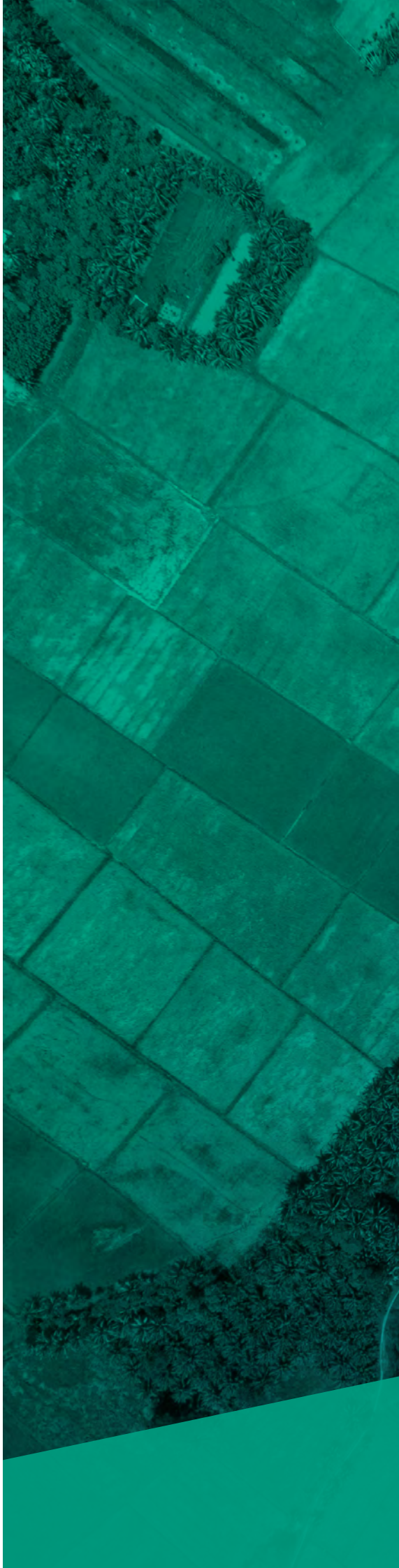
Digital advisory	Agri digital financial services	Digital procurement	Agri e-commerce	Smart farming
Agrimedia – Vietnam	**FarmTrek** – Myanmar	**SimpleAgri** – Indonesia, Malaysia, Thailand, Philippnes	**B2BPriceNow** – Philippines	**Jala** – Indonesia
FarmerLink – Philippines	**Binhi Crop Insurance** – Philippnes	**NeoInt** – Indonesia, Philippines, Malaysia	**FreshKet** – Thailand	**Tun Yat** – Myanmar
MyCrop – Indonesia	**FarmCloud** – Indonesia, Philippnes, Cambodia	**AgUnity** – Papua New Guinea, Indonesia, Solomon Islands, Vietnam	**FarmRetail** – Philippines, Cambodia	**MimosaTek** – Vietnam
GoldenPaddy – Myanmar	**Crowde** – Indonesia	**Olam's digital Solutions** – Vietnam, Indonesia	**TaniHub** – Indonesia	**PolarDrone** – Indonesia, Thailand, Vietnam, Malaysia
CropBASE – Malaysia	**The Lenddo Score** – Thailand, Philippines, Vietnam, Indonesia, Malaysia	**ScanTrust Knorr app** – Vietnam	**Talad** – Thailand	**Smarternak** – Indonesia

Figure 6

Regional map of active digital agriculture services by use case, Latin America and the Caribbean, January 2020



Digital advisory	Agri digital financial services	Digital procurement	Agri e-commerce	Smart farming
Arable Mark 2 – Mexico, Colombia, Brazil, Uruguay	**Yapu Smart Finance** – Bolivia, Ecuador, Colombia, Costa Rica	**Farmforce** - Haiti, Guatemala, Ecuador	**Smattcom** – Mexico, Colombia, Ecuador, Guatemala, Brazil, Panama, Bolivia, Cuba, Costa Rica, Honduras, Nicaragua	**UmitronCELL** – Peru
MasAgro Móvil – Mexico	**Coffee Growers' Smart ID Card** – Colombia	**TaroWorks** – Colombia	**Frubana** – Colombia, Mexico, Brazil	
Sustainable Coffee Verification – Guatemala, Honduras, Nicaragua, Costa Rica, Colombia	**EthicHub** – Mexico	**Olam's digital Solutions** – Guatemala, Nicarauga, Brazil, Colombia	**Mucho** – Colombia	
e-kakashi Smart Rice – Colombia	**Faces Microfinanzas** – Ecuador	**AgUnity** – Guatemala	**SiembraViva** – Colombia	
Farmapp – Colombia, Ecuador	**IncluirTec** – Colombia	**SimpleAgri** – Colombia	**Accesso** – Haiti, El Salvador, Colombia	



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